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Detroit Edison



November 10, 1997
NRC-97-0100

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Reference: Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43

Subject: Licensee Event Report (LER) No. 97-014

Pursuant to Fermi 2 License Condition 2.C.9, Detroit Edison is submitting the enclosed LER No. 97-014 regarding deficiencies in the fire protection system which could adversely affect the ability to achieve and maintain safe shutdown in the event of a fire. These deficiencies are identified and discussed in the attachment to this letter.

The following commitments are being made in this LER:

- Seal the four electrical penetration openings in the turbine building wall. This will be completed by the sixth refueling outage (RF06).
- An evaluation of the auxiliary building wall using the guidance of Generic Letter (GL) 86-10, "Implementation of Fire Protection Requirements," will be completed by the end of RF06 to document compliance with the Appendix R requirements.
- An Engineering Design Package (EDP) to eliminate the diesel fire pump loss of automatic suppression concern will be proposed to the Project Review Group and Project Evaluation Review Committee. A supplemental report will be submitted



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A DTE Energy Company

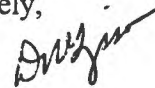
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by April 6, 1998 to update the results of these evaluations. The hourly fire watch will be maintained until implementation of permanent corrective action.

If you have any questions, please contact Norm Peterson, Licensing Director, at 313-586-4258.

Sincerely,



cc: A. B. Beach
B. L. Burgess
G. A. Harris
A. J. Kugler
M. V. Yudas, Jr.
Region III
Wayne County Emergency Management Division

CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

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AUTH. NAME AUTHOR AFFILIATION
GIPSON, D.R. Detroit Edison Co.
RECIP. NAME RECIPIENT AFFILIATION
Document Control Branch (Document Control Desk)

SUBJECT: Forwards LER 97-014-00, re deficiencies in fire protection sys
which could adversely affect ability to achieve & maintain
safe shutdown in event of fire. Listed commitments made in
LER.

DISTRIBUTION CODE: IE22T COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 2 + 8
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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Fermi 2	DOCKET NUMBER (2) 0 5 0 0 0 3 4 1	PAGE (3) 1 OF 8
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TITLE (4) **Turbine Building and Auxiliary Building Mezzanine Not Fully Meeting License Condition 2.C.9**

EVENT DATE (5)			LER NUMBER (6)					REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)												
MON	DAY	YR	YR	SEQUENTIAL NUMBER				REVISION NUMBER		MON	DAY	YR	FACILITY NAMES		DOCKET NUMBER (S)								
10	10	97	97	-	0	1	4	-	0	0	11	10	97			0	5	0	0	0			
															0	5	0	0	0				

OPERATING MODE (9) 5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR (11)														
POWER LEVEL (10) 0 0 0	<div style="display: flex; justify-content: space-between;"> <div>10 CFR <input checked="" type="checkbox"/></div> <div>OTHER - <u>License Condition 2.C.9</u></div> </div> <p style="text-align: center;">(Specify in Abstract below and in text, NRC Form 366A)</p>														

LICENSEE CONTACT FOR THIS LER (12)																	
Norm Peterson - Licensing Director												TELEPHONE NUMBER					
												AREA CODE		313		586-4258	

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)														
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)					EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR
[X] YES (If yes, complete EXPECTED SUBMISSION DATE)					[] NO		4	6	98

ABSTRACT (16)

During independent design verification of an Engineering Design Package, unsealed electrical penetrations were discovered in the auxiliary building wall fire rated separation barrier and in the adjacent and parallel turbine building fire barrier. This prompted a review of the fire hazards analysis and the 10CFR50, Appendix R assumptions used for this area. This review was completed on October 10, 1997 and revealed that of the 20 penetrations in these walls, 16 were not sealed at the auxiliary building wall and 4 were not sealed at the turbine building wall. There were no openings which were unsealed at both the turbine building wall and the auxiliary building wall. The 16 unsealed penetrations in the auxiliary building wall are located over a horizontal distance in excess of 25 feet and interface with areas which contain both redundant shutdown divisions. The lack of penetration seals in the fire barriers could allow a fire in the turbine building to exit the turbine building through any of the 4 unsealed penetrations and enter the auxiliary building at any of the sixteen unsealed penetrations. These 16 unsealed penetrations could then introduce a fire hazard within 20 feet of cable trays containing both Division I and Division II shutdown divisions. This condition is not in compliance with 10CFR50, Appendix R and is also reportable within 24 hours under License Condition 2.C(9). On October 10, 1997 at 1745 hours, the NRC was notified of this event.

An hourly fire watch was immediately established and will continue until an engineering design modification is installed to bring this area into compliance with 10CFR50, Appendix R.

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INITIAL PLANT CONDITIONS:

Operational Condition: 5 (Refueling)
 Reactor Power: 0 Percent
 Reactor Pressure: 0 psig
 Reactor Temperature: 90 degrees Fahrenheit

DESCRIPTION OF THE EVENT:

During a scheduled mid-cycle outage and while performing an independent design verification review for Engineering Design Package (EDP) 28140 "Install Evaporative Coolers for Drywell Cooling", it was discovered that four of the twenty penetrations [PEN] in the west turbine building wall were not sealed as required for a fire rated barrier. Electrical cable and cable tray penetrations in this area of the turbine building wall also penetrate the adjacent auxiliary building wall which is separated by a 4 inch seismic air space. The auxiliary building wall is the fire rated separation barrier and the adjacent turbine building wall is a fire rated barrier. Identification of the unsealed penetrations prompted a review of the fire hazards analysis and the 10CFR50, Appendix R assumptions used for this area. This review was completed on October 10, 1997 and revealed that of the 20 penetrations per wall, 16 were not sealed in the auxiliary building wall and 4 were not sealed in the turbine building wall. There were no openings which were unsealed at both the turbine building wall and the auxiliary building wall. The 16 unsealed penetrations in the auxiliary building wall (Refer to attached sketches) are located over a horizontal distance in excess of 25 feet and interface with areas which contain cable trays [TY] of both redundant shutdown divisions. The lack of penetration seals in the fire barriers would allow a fire in the turbine building to enter into an auxiliary building area containing cable trays of both Division I and Division II safe shutdown divisions.

The auxiliary building zone has full area fire suppression [KP][SRNK] and detection systems [IC] and the turbine building has a fire detection system.

During the investigation of the impact of a fire in this area, it was revealed that cables [CBL] in the starting circuit for the diesel fire pump [KP][P] run in a BOP cable tray through the turbine building and into the cable mezzanine area. An electrical ground in this cable could prevent the starting relay [RLY] from energizing which would prevent the diesel fire pump from starting on low header pressure.

This condition is not in compliance with 10CFR50, Appendix R and is also reportable within 24 hours under License Condition 2.C(9). On October 10, 1997 at 1745 hours, the NRC was notified of this event.

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CAUSE OF THE EVENT:

During the installation of the penetration seals in the auxiliary building and turbine building walls, the significance of the 4 inch seismic air space was not recognized. Since the penetrations are in close proximity to each other a fire could propagate through an unsealed penetration in one building via the 4 inch seismic air space and into another unsealed penetration in the adjacent building. The turbine building wall and parallel auxiliary building wall were treated as a single wall. When sealing the openings which penetrated both walls, the more accessible side of the "wall" was chosen to be sealed. Field Engineering Memorandum (FEM) P-3724 dated February 25, 1983 reviewed and approved the installation of 16 seals on the turbine building side and 4 seals on the auxiliary building side. Thus the total number of penetrations in this area was perceived as being sealed.

When updated, the penetration seal schedules were revised to accurately reflect the as-built locations of the sealed penetrations in the auxiliary building or the turbine building wall. The as-built drawings correctly depicted two separate walls and accurately documented the location of penetrations which were sealed.

The Appendix R requirements were documented in the Updated Final Safety Analysis Report (UFSAR) but were not transcribed to the penetration seal schedules. This omission was not noticed and the penetration seal schedules were considered to reflect the UFSAR requirements. When a surveillance of the penetration seals was performed, only the seals identified on the penetration seal schedule were inspected; therefore, the unsealed penetrations were not identified. A review of these drawings and a plant walkdown determined that configuration control was maintained. Penetrations which were indicated to be sealed on the penetration seal schedules were properly sealed.

Based on this information it was concluded that the unsealed penetrations were not the result of an oversight, but were the result of a conscious decision whereby it was believed that sealing either end of the opening met the sealing requirements. Configuration control was maintained for the actual placement of the seals

The Fire Protection System is not safety-related and electrical cables associated with it are run in nonsafety-related BOP cable trays. The fire protection system is also nonsafety-related but has redundant features, including two diverse pumps. The fire hazards analysis assumes a loss of offsite power, therefore the nonsafety-related electric fire pump is assumed to be inoperable. The water supply for the sprinkler suppression systems is provided by the diesel engine fire pump. For reasons that are not clear, the starting relay for the automatic fire pump start on low fire water header pressure was installed in the auxiliary building relay room. A ground in this cable may prevent the automatic start of the fire pump. The cause of this condition is considered to be an inadequate interdisciplinary review of the circuit routing during initial construction.

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ANALYSIS OF THE EVENT:

The hazard created by the missing penetration seals is that fire, smoke and hot gases may propagate from one fire area to another through the combination of unsealed penetrations.

The unsealed penetrations located near column 13 are located approximately 17 feet from the end of the one hour protective fire barrier on cable tray 2C-012. This penetration and the other unsealed penetrations on the wall near column 16 can also cause a fire to interact with a Division I tray, a Division I conduit, and the BOP trays in the area. In this scenario these BOP trays could be burning on the side of the fire stops which were added to prevent a fire from burning on that side. The result is that Division II circuits in tray 2C-012 south of the 1 hour barrier and other unprotected Division II Appendix R cable trays could be affected by the same fire that is potentially affecting the Division I circuits in the northern end of the mezzanine. The BOP trays in the mezzanine area and in the turbine building area include the high voltage offsite power feed cables to the safety related and BOP buses. Loss of these trays will essentially create a loss of offsite power to the safety-related buses. The result is that a turbine building fire could cause a loss of offsite power and propagate into the auxiliary building and damage both onsite power and shutdown trains in fire zone 02AB. This could adversely affect the ability to achieve and maintain safe shutdown. However, the fire on the turbine building side of the wall is considered remote since the openings are many feet above ground and there is no combustible materials within the 4 inch air gap except for cables in trays and bus ducts [BDUC].

The defense in depth philosophy employed by Detroit Edison minimizes the impact of the unsealed electrical penetrations. This is because the fire protection design in this area includes a fire detection system in both the turbine building and the auxiliary building with an alarm in the Control Room. The auxiliary building mezzanine has automatic sprinklers. All cable insulation used at Fermi is fire retardant and will not continue to burn once the source of the flame is removed. There are no significant combustibles within the 4 inch seismic air space other than the cables in trays and bus ducts. No combustibles beyond those analyzed are allowed in the mezzanine area and combustibles are controlled in the turbine building. Finally, the automatic detection in the turbine building and auxiliary building in addition to the hourly fire watch which was established on October 10, 1997 will allow early identification of a fire. The automatic suppression in the auxiliary building and the fire brigade response will provide for the rapid extinguishment before it can develop sufficiently to damage any cables.

The fire pump low pressure automatic start control circuits are located in a BOP tray entering the mezzanine area from the turbine building. A fire in this tray and damaging the cable could cause loss of fire suppression. Propagation of the fire throughout the mezzanine area could ultimately affect other safety related circuits of both divisions which could adversely affect the ability to achieve and maintain safe shutdown. Based on the control of combustibles in this area, a fire of an intensity to sufficiently degrade the cable insulation

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is considered to have a low probability. Additionally, the diesel fire pump could be started using the local emergency start switch located on the diesel fire pump.

Therefore, based on the available detection and suppression systems and the hourly fire watch, the health and safety of the public is not adversely affected by this condition.

CORRECTIVE ACTIONS:

Once the fire protection concern was identified, an hourly fire watch was established. The fire watch rounds include both the auxiliary building mezzanine area and the turbine building area and will continue until an engineering design modification is in place.

Various options for an engineering design modification were studied to determine the best solution to bring this area into compliance. It was determined that design changes to seal the turbine building wall in conjunction with an evaluation of the auxiliary building wall using the guidance of Generic Letter (GL) 86-10, "Implementation of Fire Protection Requirements," will provide compliance with the Appendix R requirements. The four electrical penetration openings in the turbine building wall will be sealed by the end of the sixth refueling outage (RF06).

A review of the penetration seal schedules and a walkdown of selected areas were performed. This review identified no other unsealed penetrations and therefore provided confidence that no other penetrations were unsealed. It also confirmed the initial belief that the penetrations in the auxiliary building wall were not sealed as the result of a conscious decision. The double wall was perceived to be a single wall; therefore, it was believed that sealing either end of the opening met the sealing requirements.

There have been many inspections and clarification requests since the FEM was written in 1983. However, an ineffective review process allowed the seal penetrations to remain unsealed on both the auxiliary building and turbine building walls. The Design Verification Review Package (DVRP) process currently used provides for more effective reviews because of its required interdisciplinary nature. No additional changes are necessary to the design review program.

The diesel fire pump condition was discovered during the investigation of the penetration seals. A modification will be proposed to the Project Review Group (PRG) and Project Evaluation Review Committee (PERC) to revise the diesel fire pump starting circuitry. This proposed configuration will prevent damage to the circuitry from an auxiliary building fire. The one-hour fire watch will continue in both locations until completion of this modification.

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ADDITIONAL INFORMATION:

A. Failed Components:

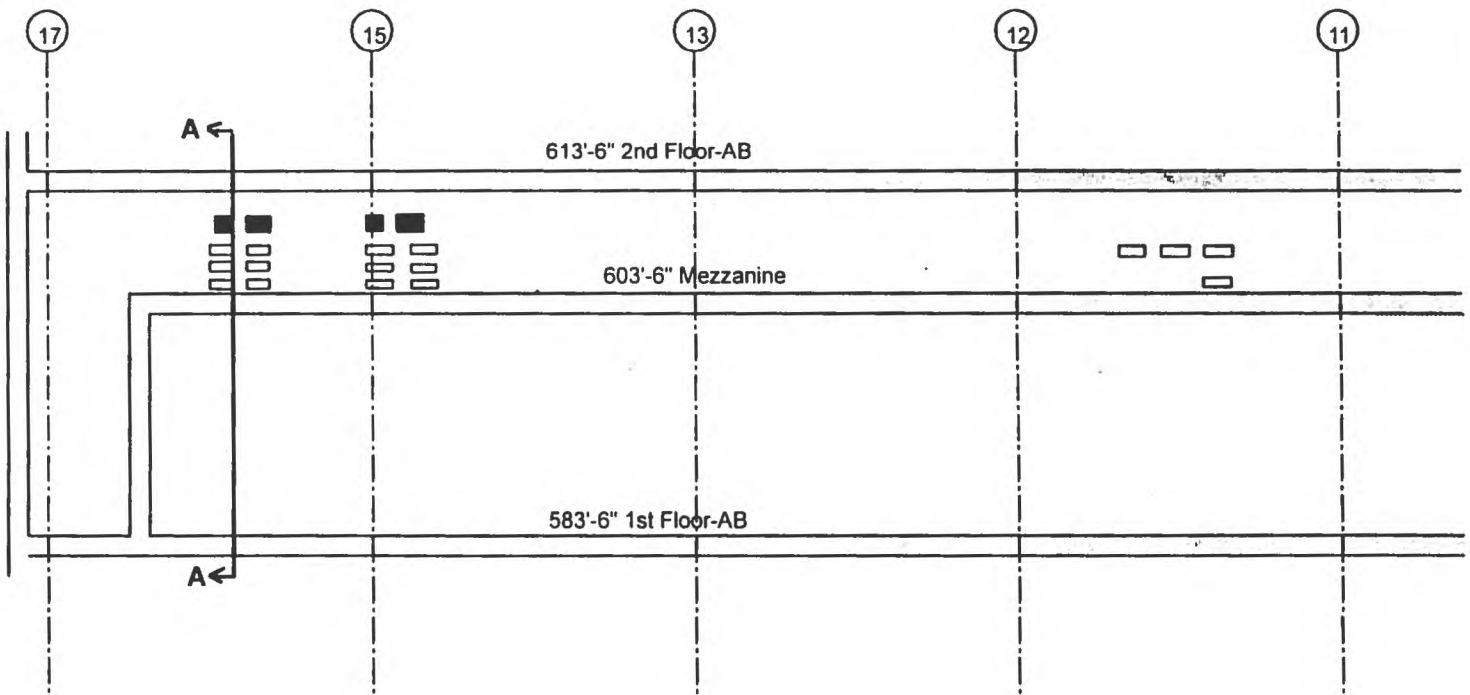
None

A. Previous LERs on Similar Problems:

LER 96-008 dated June 12, 1996 involved the Non-Interruptible Air Supply Room in the auxiliary building basement not fully meeting Appendix R criteria. Design deficiency and an error in assumptions resulted in an unwrapped cable tray in the NIAS room which could render both divisions of NIAS inoperable in the event of a fire in this area. The ability to achieve safe shutdown in the event of a fire could have been affected. The cause of this event was inadequate cross disciplinary communication regarding an evaluation submitted to the NRC to justify an alternate shutdown procedure to be in place until a dedicated shutdown panel was installed.

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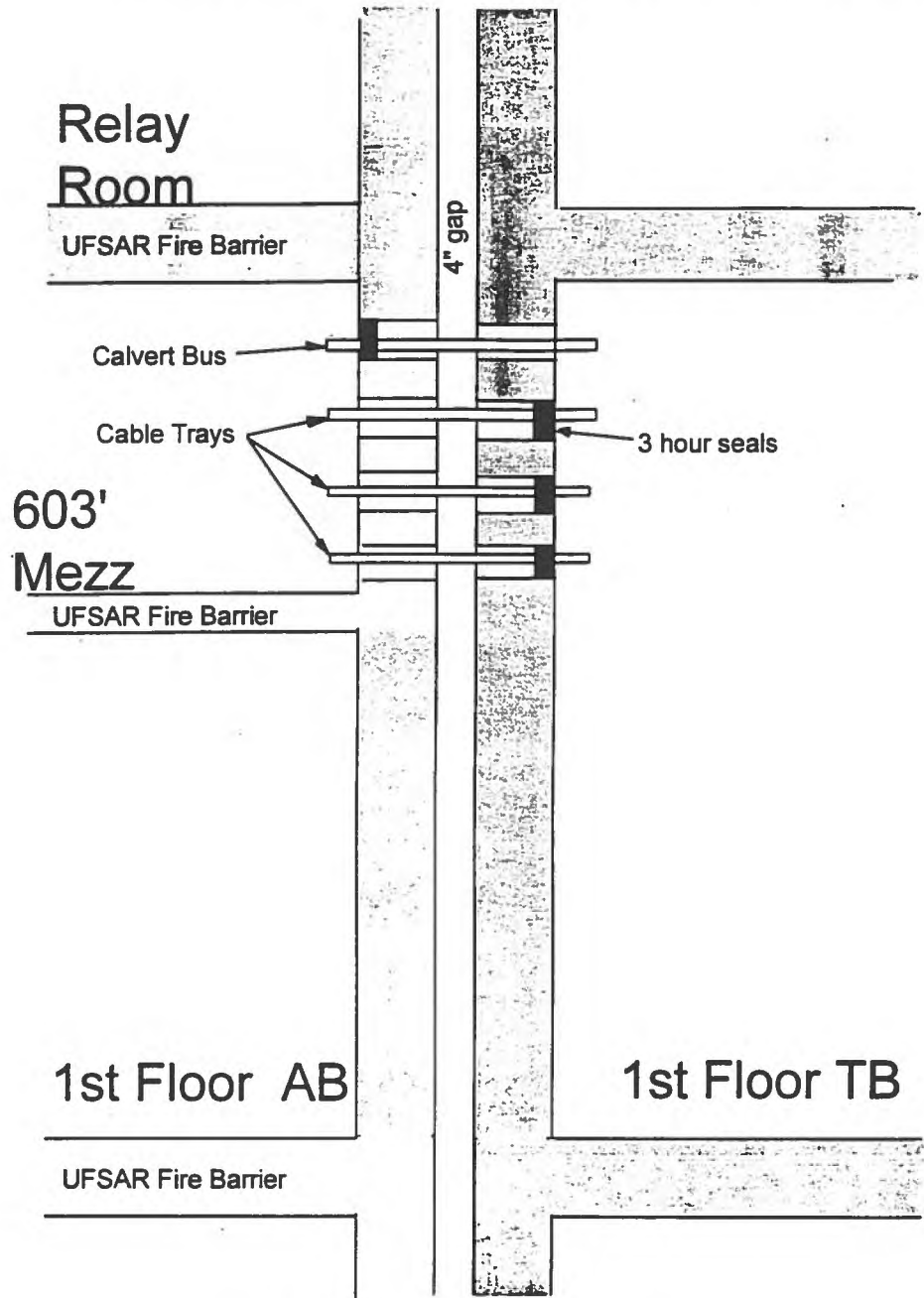
Sketch 1 AS FOUND CONDITION, AB WALL
 East Auxiliary Building Wall Along Column H
 Between 11 and 17.
 First Floor and 603'6" Mezzanine

Note: Black Penetrations are sealed, White Unsealed

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Auxiliary Building/Turbine Building Walls-Section A-A



Sketch 2, As Found Condition